Ins A7 ~~Claims~~

Sub B1 A8

1. A method for reducing the volume or rate of an encoded digital video bitstream that fulfils a certain set of predefined structural rules, **characterized** in that it comprises the steps of

- partly decoding (704) the encoded digital video bitstream, thus producing a partly decoded digital video bitstream,
- reducing (705) the amount of bits in the partly decoded digital video bitstream and
- re-encoding (706) the partly decoded digital video bitstream in which the amount of bits is reduced, thus producing a re-encoded digital video bitstream, the volume or rate of which is smaller than that of the encoded digital video bitstream, that fulfils the certain set of predefined structural rules.

2. A method according to claim 1, **characterized** in that the step of partly decoding the encoded digital video bitstream comprises the sub-steps of

- separating (502) a number of variable length encoded, weighted and quantized DCT coefficient matrices from an MPEG-2-encoded digital video bitstream and
- decoding (505) the variable length coding of said variable length encoded, weighted and quantized DCT coefficient matrices, thus producing a number of weighted and quantized DCT coefficient matrices.

3. A method according to claim 2, **characterized** in that the step of reducing the amount of bits in the partly decoded digital video bitstream comprises the sub-step of reducing (506, 507) the number of bits used to represent said weighted and quantized DCT coefficient matrices.

4. A method according to claim 3, **characterized** in that the sub-step of reducing the number of bits used to represent said weighted and quantized DCT coefficient matrices further comprises the sub-step of low-pass filtering (507) a weighted and quantized DCT coefficient matrix with a filter having a certain transfer function.

5. A method according to claim 4, **characterized** in that the sub-step of low-pass filtering said weighted and quantized DCT coefficient matrices further comprises the sub-step of adapting said transfer function according to the contents of a DCT coefficient matrix.

6. A method according to claim 3, **characterized** in that the sub-step of reducing the number of bits used to represent said weighted and quantized DCT coefficient matrices further comprises the sub-steps of

- defining a number of coefficient groups within a DCT coefficient matrix and

- low-pass filtering each of said coefficient groups with a filter having a certain transfer function associated with the coefficient group in question.

7. A method according to claim 6, **characterized** in that the sub-step of low-pass filtering each of said coefficient groups further comprises the sub-step of adapting said transfer function according to the contents of the coefficient group in question.

8. A method according to claim 7, **characterized** in that the sub-step of adapting said transfer function according to the contents of the coefficient group in question further comprises the sub-steps of
- finding the coefficient that represents the highest signal energy within the coefficient group,
- defining a certain first variable value by referring to the location of said coefficient that represents the highest signal energy within the coefficient group and
- scaling said transfer function with said first variable value, thus producing a modified transfer function which has a pass band the width of which is the greater the further said coefficient that represents the highest signal energy is in the DCT coefficient matrix from the DC coefficient of that DCT coefficient matrix.

9. A method according to claim 3, **characterized** in that the sub-step of reducing the number of bits used to represent said weighted and quantized DCT coefficient matrices further comprises the sub-step of requantizing (506) a weighted and quantized DCT coefficient matrix by dividing all coefficients contained therein by a certain second variable value.

10. A method according to claim 9, **characterized** in that it further comprises the steps of
- separating (502) from said MPEG-2-encoded digital video bitstream a piece of information describing a weighting matrix which has been used to weight a number of variable length encoded, weighted and quantized DCT coefficient matrices and
- modifying (509) said piece of information describing a weighting matrix, in order to compensate the division of coefficients by a certain second variable value, thus causing a multiplication of said weighting matrix by said second variable value.

11. A method according to claim 3, **characterized** in that the step of re-encoding the partly decoded digital video bitstream comprises the sub-step of variable length coding (508) the DCT coefficient matrices after reducing the number of bits used to represent said DCT coefficient matrices.

12. A method according to claim 2, **characterized** in that in order to complement the step of reducing the amount of bits in the partly decoded digital video bitstream it comprises the sub-steps of

- separating (502) a number of virtual buffer verifier values from said MPEG-2-encoded digital video bitstream and
- modifying (510) said virtual buffer verifier values, thus producing modified virtual buffer verifier values that are in accordance with the re-encoded digital video bitstream the volume or rate of which is smaller than that of the encoded digital video bitstream.

13. An arrangement for reducing the volume or rate of an encoded digital video bitstream that fulfils a certain set of predefined structural rules, **characterized** in that it comprises
- means for partly decoding (502, 505) the encoded digital video bitstream,
- means for reducing (506, 507) the amount of bits in the partly decoded digital video bitstream and
- means for re-encoding (508) the partly decoded digital video bitstream in which the amount of bits is reduced.

14. An arrangement according to claim 13, **characterized** in that it comprises
- a bitstream analyzer (502) arranged to separate a number of variable length encoded, weighted and quantized DCT coefficient matrices from an MPEG-2-encoded digital video bitstream,
- a variable length decoder (505) for decoding the variable length coding of said variable length encoded, weighted and quantized DCT coefficient matrices and
- means for reducing (506, 507) the number of bits used to represent said weighted and quantized DCT coefficient matrices.

15. An arrangement according to claim 14, **characterized** in that said means for reducing the number of bits used to represent said weighted and quantized DCT coefficient matrices comprise a filtering block (507) for filtering the coefficients contained in DCT coefficient matrices.

16. An arrangement according to claim 15, **characterized** in that said filtering block (507) is a low pass filter with a certain transfer function.

17. An arrangement according to claim 16, **characterized** in that said low pass filter (507) has a transfer function which is dependent on the contents of the DCT coefficient matrix which is filtered.

18. An arrangement according to claim 15, **characterized** in that said filtering block (507) is arranged to implement a multitude of different filtering functions upon different coefficient groups within a single DCT coefficient matrix.

19. An arrangement according to claim 18, **characterized** in that said filtering block (507) is arranged to implement a multitude of different filtering functions upon different

coefficient groups within a single DCT coefficient matrix, wherein each filtering function is dependent on the contents of the coefficient group which is filtered.

20. An arrangement according to claim 14, **characterized** in that said means for reducing the number of bits used to represent said weighted and quantized DCT coefficient matrices comprise a requantization block (506) arranged to divide a DCT coefficient matrix by a certain second variable value.

21. An arrangement according to claim 14, **characterized** in that it comprises
- an input (501) and an output (504),
- a bitstream analyzer (502) coupled to said input (501), said bitstream analyzer having first, second, third and fourth data outputs and a control output,
- a multiplexer (503) coupled to said output (504), said multiplexer having first, second, third and fourth data inputs and a control input,
- an essentially direct connection from the control output of said bitstream analyzer (502) to the control input of said multiplexer (503),
- an essentially direct connection from the first data output of said bitstream analyzer (502) to the first data input of said multiplexer (503),
- between the second data output of said bitstream analyzer (502) and the second data input of said multiplexer (503) a series connection where a variable length decoder (505) is coupled to the second data output of said bitstream analyzer (502), a variable length re-encoder (508) is coupled to the second data input of said multiplexer (503), and between said variable length decoder (505) and said variable length re-encoder (508) there are a requantizing block (506) and a DCT filtering block (507) in any order, of which said variable length decoder (505), said variable length re-encoder (508)and said requantizing block (506) each comprise a control output,
- between the third data output of said bitstream analyzer (502) and the third data input of said multiplexer (503) an element-wise matrix multiplier block (509) having a control input which is coupled to the control output of said requantizing block (506) and
- between the fourth data output of said bitstream analyzer (502) and the fourth data input of said multiplexer (503) a virtual buffer verifier value modifier block (510) having first and second control inputs of which the first control input is coupled to the control output of said variable length decoder (505) and the second control input is coupled to the control output of said variable length re-encoder (508).